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USSR: Early Look at the 1975 Grain Crop Apr 75 ER IB 75-3

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USSR: EARLY LOOK AT THE 1975 GRAIN CROP

SUMMARY

1. The USSR is headed toward a bumper grain harvest. An early forecast puts 1975 Soviet grain production at about 220 million metric tons, close to the 1973 record of 222.5 million tons. The estimate is based on prospects for a record winter grain crop of roughly 70 million tons and the outlook for an above-average spring grain harvest.

2. At this early date, however, the forecast is subject to considerable uncertainty. Last year, for example, a mid-May freeze hurt the winter crop, and a summer drought cut spring grain yields. Parts of the spring grain area currently have below-normal soil moisture. Rainfall in May and early June – always important in these areas – is therefore critical this year.

3. The projected output will cover requirements for domestic use and export in 1975. Although the Soviets may buy grain for their livestock program, they have not shown interest in new grain purchases since last year's harvest. In any case, the USSR probably will not enter the market before early summer, when it can better assess its needs and the trend in world grain prices.

DISCUSSION

Introduction

4. Because of the Soviet Union's potential impact on international grain markets, the size of the USSR's 1975 grain crop is of great importance. Based on information available in mid-April, this publication discusses the status of the Soviet grain crop, makes a preliminary estimate of grain production, and comments on the prospects for Soviet grain imports. Because weather conditions in late spring and early summer greatly affect the harvest of winter grains and the development of spring grains, the projections in this publication are tentative. By mid-June, production prospects will be much clearer.

Note: This publication was prepared by the Office of Economic Research. It incorporates materials and analysis supplied by the Environment Analysis Staff of the Office of Geographic and Cartographic Research. Comments and queries regarding this publication are welcomed and may be directed to [redacted] of the Office of Economic Research, Code 143, Extension 5107.

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Status of the Winter Grain Crop

5. Conditions during the past winter – probably the warmest winter in Soviet history – have been generally favorable for winter grains. Most of the winter grain area enjoyed near-normal precipitation and near- or slightly above-normal temperatures last fall, followed by below-normal precipitation and higher than normal temperatures after the first of the year. About half of the USSR's bread grain and roughly one-third of its total grain supply come from winter grains, principally wheat and rye.

6. In the fall of 1974, the Soviet Union planted about 35-1/2 million hectares of winter grains, less than the 37 million hectares planted in 1974 and below the average for the last few years. Dry conditions in parts of the winter grain area slowed last fall's planting operations. The late sowing heightened Soviet concern that a sudden cold snap, without a week or two of cool weather to prepare the crop for wintering, would kill many of the new plants. A mild fall and a period of gradual cooling ensued, however, giving the winter grains ample time to develop and to toughen before entering dormancy.

7. Nevertheless, the winter was not problem-free. Heavy rains at the end of October and the beginning of November caused extensive flooding in the southern part of Belorussia, in the western Ukraine, and in parts of Lithuania. The floods washed out some fields; in other fields, standing water killed plants in this already predominantly marshy area. In mid-January, the western and southern half of the winter grain area was in jeopardy. Unseasonably warm weather melted the snow; without this protective layer, several days of extremely cold temperatures could have caused substantial winterkill. In late January, however, snow fell, averting the danger.

8. Because of the unusually warm weather, plants generally are in good condition. Normally, more than 7 million hectares of grain are either killed during the winter or are used as green forage to feed livestock in the spring. Of the 35-1/2 million hectares sown last fall, only about 5-1/2 million hectares will not be harvested this summer (see Figure 1). Crops on roughly a million hectares of this area were destroyed by last November's heavy rains and floods.[1] [redacted]

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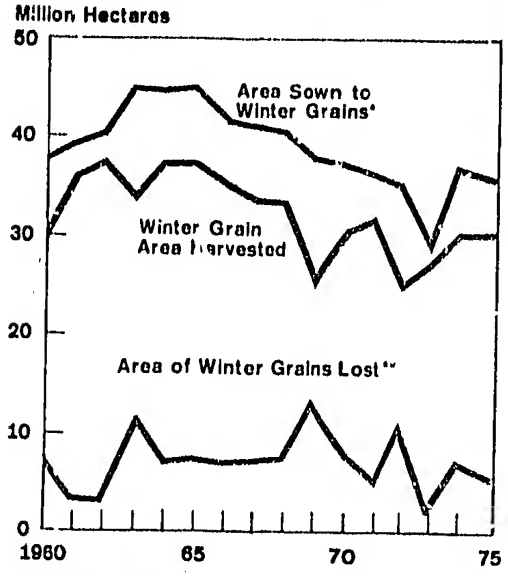
[redacted]

1. [redacted] the Environment Analysis Staff of the Office of Geographic and Cartographic Research estimates that approximately 40% to 50% of the crops in the flooded area – which represents less than 10% of the winter grain area – were either severely damaged or killed.

[redacted]

Figure 1

USSR: History of Winterkill



*Sown in the preceding fall for harvest in the given year.

**Also includes some fall sown grains used as green forage crops for livestock in the spring.

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The damaged area will be resown with lower yielding spring grains, resulting in a net loss of about one million tons of grain.

Outlook for Grain Production

Winter Grains

9. Despite below-normal soil moisture in Moldavia and the southern Ukraine, we expect a record winter grain crop. Although adequate spring moisture is necessary for grain development, winter grain yields largely depend on winter temperature.[2] Last winter's consistently warm temperatures therefore may well result in record yields for winter grains. At the same time, because the area lost to winterkill is smaller than usual, about 30 million hectares of winter grain will be harvested—3 million hectares more than the area that produced the record 63.5 million tons in 1973.

10. Consequently, the USSR could harvest about 70 million tons of winter grain in 1975. A crop of this magnitude is far from certain, of course. Late frosts could reduce yields. Last year, freezing temperatures in mid-May caused considerable damage in some of the winter grain areas. Moreover, the warm temperatures that have boosted current yields may create other problems.

- Weed infestation is likely to be greater than usual.
- A higher incidence of disease is possible as a result of the lush plant growth and the warm winter.
- Lush growth will also contribute to lodging and wind damage, making harvesting more difficult.

2. For a more complete discussion of the effect of weather on grain yields, see the Appendix.

Spring Grains

11. Spring sowing has begun earlier than usual. By 14 April, 19-1/2 million hectares of spring grain, excluding corn, had been sown. The harvested area for spring grains is expected to be greater than in recent years, as follows:

	Million Hectares	
	Total	Spring Grains
1970	119.3	89.5
1971	117.9	86.4
1972	120.2	95.7
1973	126.7	99.8
1974	127.2	97.3
1975 (est.)	130.0	100.0

12. The outlook for spring grains is far more tentative than the prospects for the winter crop. Unlike winter grains, spring grains are grown mainly in low-moisture areas, and moisture deficiency is the principal factor limiting yields. Much of the yearly precipitation in these areas occurs from May to July, and rains during this period affect spring wheat yields more than the precipitation accumulated during the winter.

13. Cumulative precipitation in the spring grain area during October through March was below normal[3]:

Annual Average	Precipitation October Through March (Millimeters)
1962/74	167
1971/72	184
1972/73	176
1973/74	182
1974/75	146

14. Distribution of the precipitation to date has not been even. Most spring grain areas have normal or near-normal moisture supplies; western Kazakhstan and Kustany oblast (which account for about 10% of the spring grain area and about 4% of the spring grain) are especially dry. Even if normal amounts of precipitation

3. Precipitation in each spring grain area is weighted by its share of the total area sown in spring wheat.

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are recorded during the next two months, yields in these areas are expected to be below average.

15. Unless the area affected by critical moisture deficiency increases, however, a spring grain yield of about 15 centners per hectare is likely. A yield of this magnitude is somewhat above average but consistent with the trend since the mid-1960s. If the sowing plan is fulfilled and 100 million hectares are harvested, 150 million tons of spring grain would result. It is important to note, however, that it is much too early in the crop year to make such an estimate with certainty. Spring grain yields will be determined largely by weather conditions in the next two months.[4] Moreover, the estimated area for spring grains is also uncertain at this early date.

Total Production

16. With 70 million tons of winter grain and 150 million tons of spring grains, total production would amount to 220 million tons. This is near the record 222.5 million tons harvested in 1973, up 12-1/2% from the 195.6 million tons raised last year and more than 4 million tons greater than the Soviets' 1975 production plan. Harvesting problems with the winter crop or continued dry weather in the spring grain areas are major factors that could drop output to the planned 215.7 million tons or less. On the other hand, a good summer in the spring grain areas could result in a new record harvest for all grain in 1975.[5]

Grain Requirements and Trade Prospects

17. The Soviets are not expected to make major grain purchases this year. Barring unusual quality problems, a grain harvest of 220 million tons would exceed the Soviets' anticipated 1975 needs of about 210 million tons. Moreover, reserve stocks probably are at the highest level in recent years.[6] Although the Soviets will continue to need to import some feed grain for their livestock program, they probably will not enter the market before early summer, when they can better assess their needs and the trend in world grain prices.

4. In 1974, for example, weather/yield relationships at the end of March indicated a spring wheat yield of 14.3 centners per hectare. Largely as a result of a summer drought in the spring grain areas, the actual spring wheat yield was 9.5 centners per hectare. Estimates of winter wheat and all grain were more reliable: estimates were 26.1 and 17.7 centners per hectare, respectively, compared with actual yields of 24 and 15.4 centners per hectare.

5. On the basis of the descriptive ability of the weather/yield relationships employed (using weather through March), there is one chance in six that grain production will be below 208 million tons and one chance in six that the harvest will be above 232 million tons.

6. Because of conditions during harvesting, however, the quality of at least part of these stocks is questionable.

18. Because of the good crop prospects and sizable stocks, the Soviets have shown no interest in new grain purchases since last year's harvest. The only action taken in 1975 has been a readjustment of contracts made last year. Most of the 95,000 tons of wheat contracted for from Argentina was resold to Italy. Some contracts for wheat were switched to corn (200,000 tons) or canceled (32,000). About 330,000 tons of wheat and 650,000 tons of corn remain to be shipped under old US contracts as of 13 April.

19. Although it was learned early in the year that the Soviets might want to buy more US corn, they have not picked up any of the 500,000 tons of corn offered by the United States. Rather, the Soviets are concerned with the quality of US corn currently arriving in the USSR and have told an official of the US Department of Agriculture that failure to resolve quality problems could jeopardize the demand for US corn.

APPENDIX

WEATHER FACTORS AFFECTING GRAIN YIELD

Weather/yield relationships have been used in this publication to estimate yields for all grains, winter wheat, and spring wheat. This appendix discusses the major yield-determining weather factors involved.

Winter Grains

Winter grains are grown primarily in areas with abundant moisture. Although moisture during planting and germination in the fall and during plant development in the spring is important, the moisture level during winter and early spring is not the principal variable controlling yields. Rather, winter temperatures are the single most important factor. Warm winters – which generally mean less winterkill – lead to high yields of winter grain.

Variations in winter temperature alone explain as much as 46% of the variance in yields of winter wheat. The addition of all other weather variables explained increases in maximum variance of only 7 percentage points.* The close relationship between average temperatures for November through February and winter wheat yields is shown in Figure A-1. The poor relationship between winter precipitation (October through March) and winter wheat yields is illustrated by the random scatter of the points in Figure A-2.

Generally, these relationships are valid in all the major winter grain regions. In the southern winter grain areas, precipitation in late spring plays a more important role than it does in other crop regions. Even here, however, winter temperature remains the dominant variable.

Spring Grains

Moisture deficiency is the most important factor limiting spring grain yields. Although moisture accumulation during the winter is important, spring grain yields

* As stated, winter temperature alone explains a maximum of 46% of the variance in winter wheat yields. A linear time trend – which primarily reflects changes in technology – accounts for a maximum of 31% of the variance, whereas precipitation during the growing season accounts for a maximum of 24%. Because of cross correlation between these parameters -- especially the positive correlation between precipitation and winter temperatures – their effects are not additive. The maximum variance explained by all weather variables is 53%. The explained variance is increased to 69% by addition of a technology time trend and to 83% by adjustment to regional means and time trends.

depend more on March through June precipitation than on winter precipitation.** Nevertheless, high soil moisture in either May or June depresses yields. In addition, spring grains also are affected favorably by cool summer temperatures.

All Grain

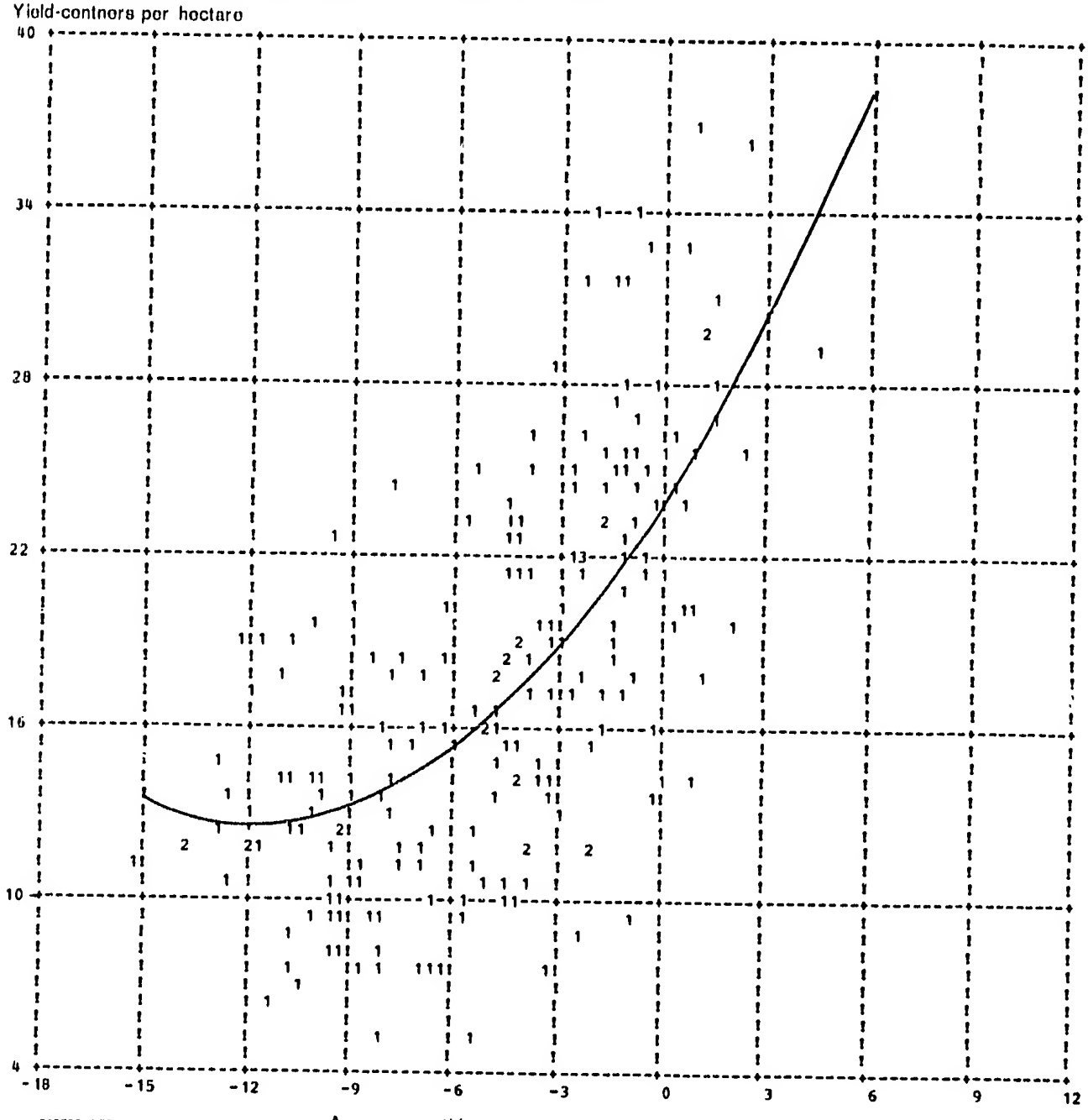
The winter variables that influence winter grains, particularly winter temperature, also affect all grain yields. A warm winter generally leads to higher winter grain yields. In the spring grain areas, a warm winter increases the chances for a wetter than normal spring and for a shift, at least temporarily, to a maritime climate with relatively cool summers. Both of these factors favor spring grains. About 90% of the variance in all grain yields can be explained by using weather and time trends.

** Winter precipitation explains a maximum of 26% of the variance in spring wheat yields. Precipitation during March to June alone explains a maximum of 41% of the variance. Again, because of cross correlation, the effect of these variables is not additive. Weather conditions through July explain a maximum of 51% of the variance in spring wheat yields. Inclusion of a time trend boosts the maximum explained variance to 59%, while the addition of regional adjustments raises the explained variance to a maximum of 76%.

USSR: Relationship Between Winter Wheat Yields and November Through February Temperature

Figure A-1

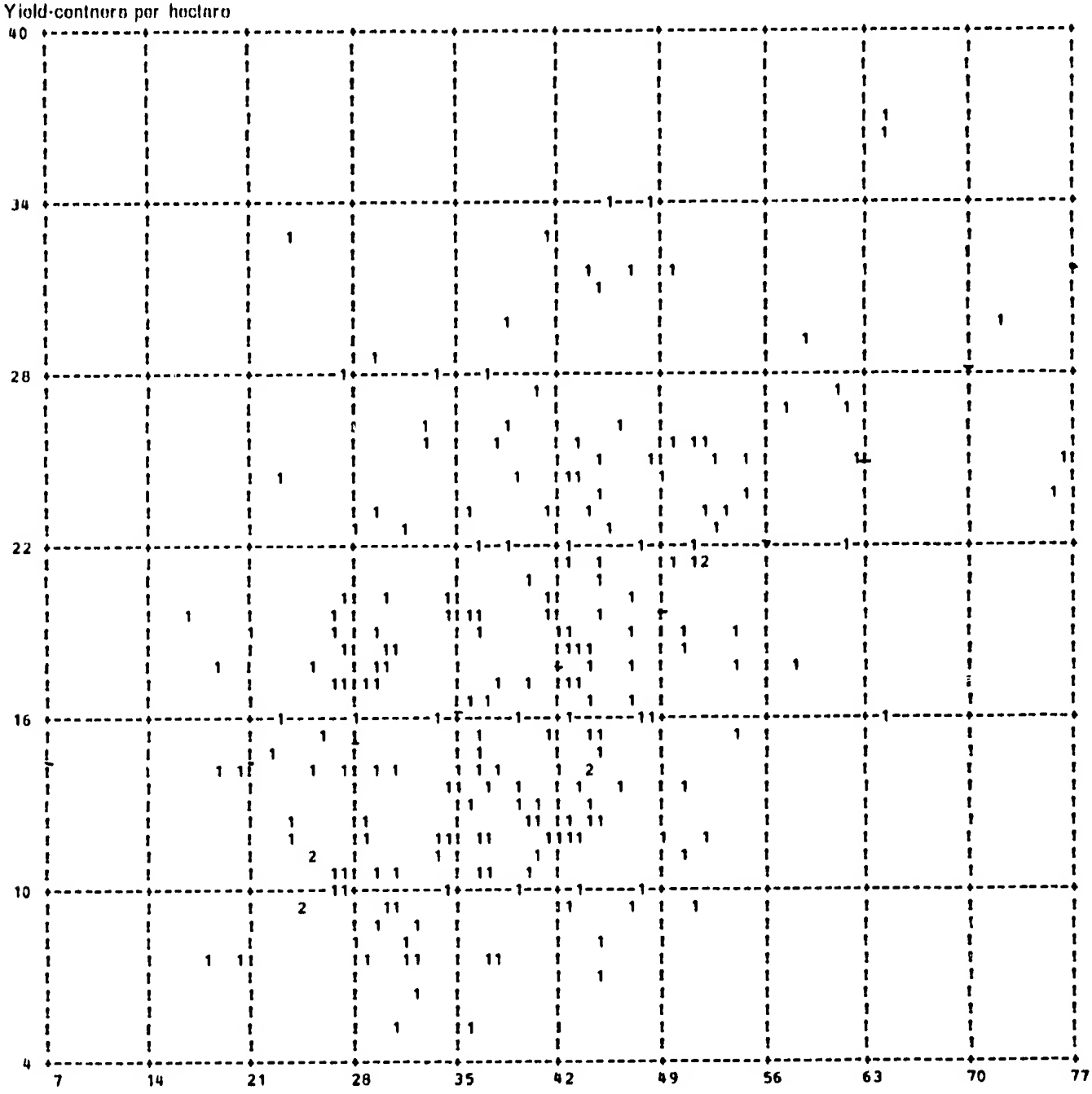
(Observations for 27 crop regions from 1962 to 1972)



USSR: Relationship Between Winter Wheat Yields and October Through March Precipitation

Figure A-2

(Observations for 27 crop regions from 1962 to 1972)



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